

OCEANOGRAPHIC PROPERTIES IN THE IONIAN SEA IN WINTER AND SUMMER 2008

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Abstract

The state of the art of the oceanographic properties in 2008 of the Ionian Sea is derived from the data sets collected during two campaigns in the framework of the SESAME project. The physical characteristics of the main water masses present in the basin and their seasonal differences are described. The long-term changes in the deep water in the central Ionian Sea are traced by the use of the ¹³⁷Cs content and associated with a change of the thermohaline properties in the last two decades.

Keywords: *Ionian Sea, Density, Salinity, Temperature*

Surface dynamical features characteristic of the Ionian Sea area are described by means of satellite altimetric imagery (absolute dynamic topography; <http://www.aviso.oceanobs.com/en/data/product-information/duacs/index.html>). They are compared to the subsurface current field measured by a vessel-mounted Acoustic Doppler Current Profiler along the track of the research vessel. The Ionian basin is characterised by the overall anti-cyclonic surface circulation at surface, within which a number of sub-basin and meso-scale gyres and eddies, both clock-wise and anti-clockwise are imbedded. The most persistent is the Pelops anti-cyclonic gyre. These structures influence the distribution and the pathways of the surface and intermediate water masses (Ionian Surface Water, Atlantic Water, and Levantine Intermediate Water, in particular). During winter the upper layer is relatively well mixed. The Atlantic Water (salinity 38.4) is confined to the western portion of the W-E section from the surface down to 100 m (Fig. 1). Levantine Intermediate Water (salinity > 38.9) spreads westward from the eastern Ionian in the layer 150-500 m.

waters (Eastern Mediterranean Deep Water, EMDW) of Adriatic origin (salinity 38.74), while to the east less saline dense waters reside. The most recent EMDW (of Adriatic origin) has higher salinity and temperature values. The present state is compared to changes in the central Ionian Sea during the last two decades [1], and illustrated also by the uplifting of the old bottom waters (detected by means of the ¹³⁷Cs content).

References

1 - Manca B.B., Budillon G., Scarazzato P., and Ursella L., 2003. Evolution of dynamics in the eastern Mediterranean affecting water mass structures and properties in the Ionian and Adriatic Seas. *J. Geophys. Res.*, 108, C9, doi: 10.1029/2002JC001664.

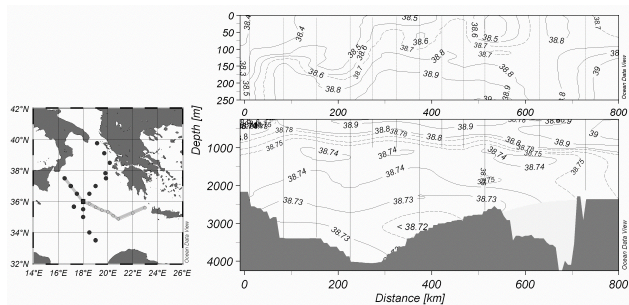


Fig. 1. Vertical distribution of salinity along the W-E section in winter 2008. A rectangular area in the inserted map indicates the central Ionian station.

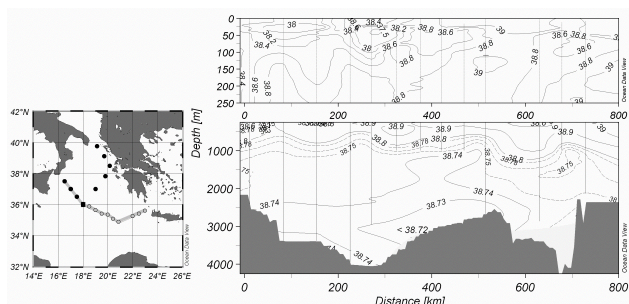


Fig. 2. Vertical distribution of salinity along the W-E section in summer 2008. A rectangular area in the inserted map indicates the central Ionian station.

In summer (Fig. 2), stratification in the upper layer and the sub-basin scale eddies influence the recirculation of the Atlantic Water (minimum salinity < 38 in the 30-50 m layer below the surface), while the Levantine Intermediate Water is down-welled by the Pelops anticyclone. Below the Transitional Mediterranean Water (characterized by an oxygen minimum at around 1000 m) the deepest zones to the west and in the central Ionian are filled with the dense